

any two points, and it measures the extent to which an area is flat or hilly. The steepness of hills is measured by slope, which is the relief divided by the distance between two points. Figure 1-4 shows a portion of a USGS map for northern Mississippi, at the scale of 1:24,000. The brown lines on the map are contour lines that connect points of equal elevation above or below sea level. Contour lines are closer together to show steeper slopes and farther apart in flatter areas.

THE NETHERLANDS: SENSITIVE ENVIRONMENTAL MODIFICATION. Few regions have been as thoroughly modified by humans as the Netherlands. Because more than half of the Netherlands lies below sea level, most of the country today would be under water if it were not for massive projects to modify the environment by holding back the sea. The Dutch have a saying that “God made Earth, but the Dutch made the Netherlands.” The Dutch have modified their environment with two distinctive types of construction projects—polders and dikes.

A **polder** is a piece of land that is created by draining water from an area. Polders, first created in the thirteenth century, were constructed primarily by private developers in the sixteenth and seventeenth centuries and by the government during the past 200 years. All together, the Netherlands has 6,500 square kilometers (2,600 square miles) of polders, comprising 16 percent of the country's land area (Figure 1-15). The Dutch government has reserved most of the polders for agriculture to reduce the country's dependence on imported food. Some of the polders are used for housing, and one contains Schiphol, one of Europe's busiest airports.

The second distinctive modification of the landscape in the Netherlands is the construction of massive dikes to prevent the North Sea, an arm of the Atlantic Ocean, from flooding much of the country. The Dutch have built dikes in two major locations—the Zuider Zee project in the north and the Delta Plan project in the southwest.

The Zuider Zee, an arm of the North Sea, once threatened the heart of the Netherlands with flooding. A dike completed in 1932 caused the Zuider Zee to be converted from a saltwater sea to a freshwater lake. The newly created body of water was named the IJsselmeer, or Lake IJssel, because the IJssel River now flows into it. Some of the lake has been drained to create several polders, encompassing an area of 1,600 square kilometers (620 square miles).

A second ambitious project in the Netherlands is the Delta Plan in the southwestern part of the country. Flowing through the Netherlands are several important rivers, including the Rhine (Europe's busiest river), the Maas (known as the Meuse in France), and the Scheldt (known as the Schelde in Belgium). As these rivers flow into the North Sea, they split into many branches and form a low-lying delta that is vulnerable to flooding. After a devastating flood in January 1953 killed nearly 2,000 people, the Delta Plan called for the construction of several dams to close off most of the waterways from the North Sea. The project took 30 years to build and was completed in the mid-1980s.

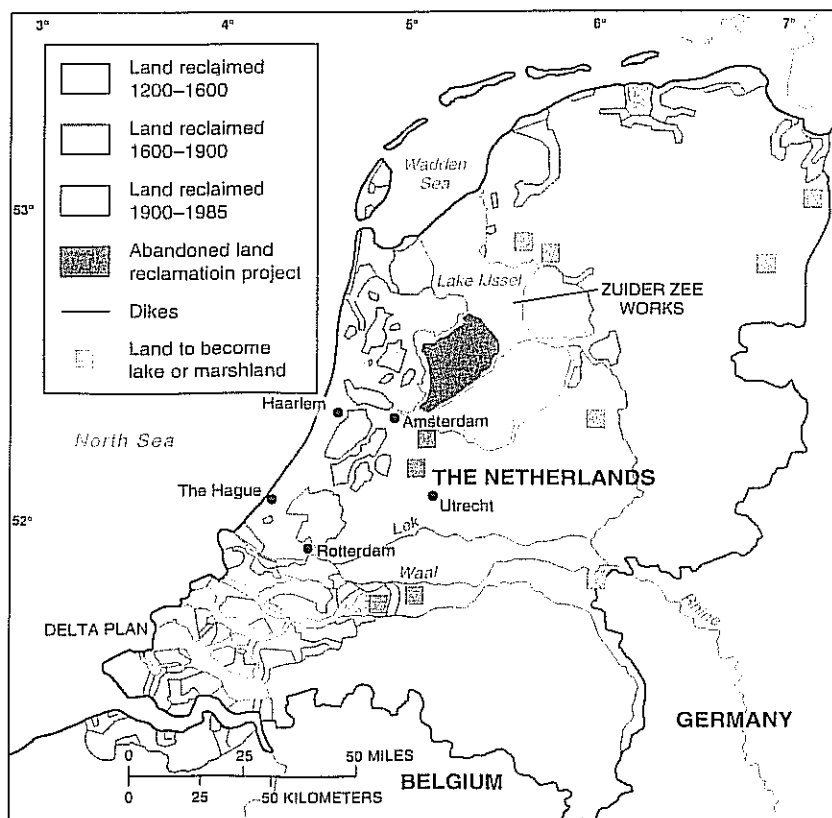
With these two massive projects finished, attitudes toward modifying the environment have changed in the Netherlands. The Dutch have scrapped plans to build additional polders in

FIGURE 1-15 Environmentally sensitive cultural ecology in the Netherlands. The Dutch people have considerably altered the site of the Netherlands through creation of polders and dikes. The first step in making a polder is to build a wall encircling the site, which is still under water. Then the water inside the walled area is pumped from the site into either nearby canals or the remaining portion of the original body of water. Once dry, the site is prepared for human activities.

Before the invention of modern engines, the pumping operation was performed by windmills. Many of the windmills remain as a picturesque element of the Dutch landscape, although they were originally built for a practical purpose.

In the late nineteenth century, a Dutch engineer named Cornelis Lely proposed an ambitious project to seal off the Zuider Zee permanently from the North Sea, the ultimate source of the floodwaters. In accordance with Lely's plan, a dike was built, 32 kilometers (20 miles) long, across the mouth of the Zuider Zee to block the flow of North Sea water.

After a devastating flood in 1953, the Delta Plan built dikes to close off most of the waterways in the southwestern part of the country. Because Rotterdam, Europe's largest port, is located nearby, some of the waterways were kept open.



the IJsselmeer in order to preserve the lake's value for recreation. A plan adopted in 1990 calls for returning 263,000 hectares (650,000 acres) of farms to wetlands or forests. Widespread use of insecticides and fertilizers on Dutch farms contributes to contaminated drinking water, acid rain, and other environmental problems. The Dutch are deliberately breaking some of the dikes to flood fields.

Global warming could threaten the Netherlands by raising the level of the sea around the country by between 20 and 58 centimeters (8 and 23 inches) within the next 100 years. Rather than build new dikes and polders, the Dutch have become world leaders in reducing the causes of global warming by acting to reduce industrial pollution and increase solar and wind power use, among other actions.

FLORIDA: NOT-SO-SENSITIVE ENVIRONMENTAL MODIFICATION. Humans do not always modify the environment as sensitively as the Dutch. The fragile landscape of south Florida has been altered in insensitive ways, especially the barrier islands along the Atlantic and Gulf coasts, the wetlands between Lake Okeechobee and the Everglades National Park, and the Kissimmee River between Lake Kissimmee and Lake Okeechobee (Figure 1-16).

Several hundred thousand people live on barrier islands in Florida, as well as elsewhere along the Atlantic and Gulf coasts between Maine and Texas. These barrier islands are essentially large sandbars that shield the mainland from flooding and storm damage. They are constantly being eroded and shifted from the force of storms and pounding

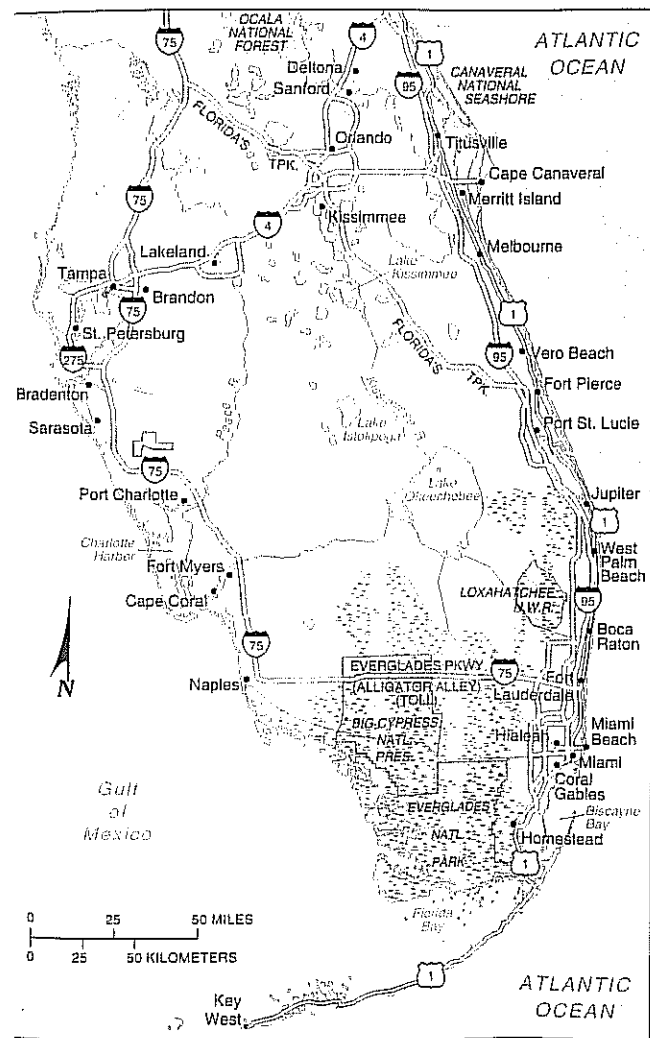


FIGURE 1-16 Environmentally insensitive cultural ecology in Florida. To control flooding in central Florida, the U.S. Army Corps of Engineers straightened the course of the Kissimmee River, which had meandered for 60 kilometers (98 miles) from near Orlando to Lake Okeechobee. The water was rechanneled into a canal 90 meters wide (300 feet) and 9 meters deep (30 feet), running in a straight line for 84 kilometers (52 miles). After the canal, known as C-38, opened in 1971, millions of gallons of polluted water—mainly runoff from cattle grazing—began pouring into Lake Okeechobee, which is the major source of fresh water for about half of Florida's population. Now the state wants the U.S. Army Corps of Engineers to return the river from the canal (between top and bottom on the right side of the photograph) to its original course (left rear in the photograph).

surf, and after a major storm, large sections are sometimes washed away.

Despite their fragile condition, the barrier islands are attractive locations for constructing homes and recreational facilities to take advantage of proximity to the seashore. Most of the barrier islands are linked with the mainland by bridge, causeway, or ferry service.

To fight erosion along the barrier islands, people build seawalls and jetties, which are structures extending into the sea, but these projects result in more damage than protection. A seawall or jetty can prevent sand from drifting away, but by trapping sand along the up-current side, it causes erosion on the barrier islands on the down-current side.

The Everglades was once a very wide and shallow freshwater river 80 kilometers (50 miles) wide and 15 centimeters (6 inches) deep, slowly flowing south from Lake Okeechobee to the Gulf of Mexico. A sensitive ecosystem of plants and animals once thrived in this distinctive landscape, but much of it has been destroyed by human actions. The U.S. Army Corps of Engineers built a levee around the lake during the 1930s, drained the northern one-third of the Everglades during the 1940s, diverted the Kissimmee River into canals during the 1950s, and constructed dikes and levees near Miami and Fort Lauderdale during the 1960s. The southern portion of the Everglades became a National Park.

These modifications opened up hundreds of thousands of hectares of land for growing sugarcane and protected farmland as well as the land occupied by the growing South Florida population from flooding. But they had unintended consequences for South Florida's environment. Polluted water mainly from cattle grazing along the banks of the canals flowed into Lake Okeechobee, which is the source of fresh water for half of Florida's population. Fish in the lake began to die from the high levels of mercury, phosphorous, and other contaminants. The polluted water then continued to flow south into the National Park, threatening native vegetation such as sawgrass and endangering rare birds and other animals.

The 2000 Comprehensive Everglades Restoration Plan called for restoring the historic flow of water through South Florida while improving flood control and water quality. The plan called for a national-state partnership to undertake 68 restoration projects over 30 years. Dikes would be removed, farmland flooded, and water stored underground. The state of Florida spent \$1 billion on acquiring land in the area, but few elements of the plan were accomplished. In an ironic reminder of the Dutch saying quoted earlier, Floridians say "God made the world in six days, and the Army Corps of Engineers has been tinkering with it ever since."

KEY ISSUE 3

Why Are Different Places Similar?

- Scale: From local to global
- Space: Distribution of features
- Connections between places

Although accepting that each place or region on Earth is unique, geographers recognize that human activities are rarely confined to one location. Discussed in this section are three basic concepts—scale, space, and connections—that help geographers understand why two places or regions can display similar features.

Scale: From Local to Global

Geographers think about scale at many levels, from local to global. At a local scale, such as a neighborhood within a city, geographers tend to see unique features. At the global scale, encompassing the entire world, geographers tend to see broad patterns.

A generation ago, people concerned with environmental quality proclaimed, "Think global, act local." The phrase meant that the environment was being harmed by processes such as global warming that were global in scale, but it could be improved by actions, such as consuming less gasoline, that were local in scale. Contemporary geographers offer a different version of the phrase: "Think and act both global and local." All scales from local to global are important in geography—the appropriate scale depends on the specific subject.

Geography matters in the contemporary world because it can explain human actions at all scales, from local to global. At the national and international scales, geography is concerned with such questions as where the population is growing rapidly, where the followers of different religions live, and where corporations place factories. And geography studies why these arrangements can cause problems: why can rapid population growth exceed available food supply, why are different religious groups unable to live in peace with each other, and why are some places unable to attract or retain industries.

Globalization of Economy

Scale is an increasingly important concept in geography because of globalization, which is a force or process that involves the entire world and results in making something worldwide in scope. Human activities are rarely confined to one location. The world contains only a handful of individuals who lead such isolated and sheltered lives that they have never watched a television set, used a telephone, or been in a motor vehicle. Even extremely isolated and sheltered people are at least aware of the existence of these important means of connection.

Globalization means that the scale of the world is shrinking—not literally in size, of course, but in the ability of a person, object, or idea to interact with a person, object, or idea in another place. People are plugged into a global economy and culture, producing a world that is more uniform, integrated, and interdependent.

A few people living in very remote regions of the world may be able to provide all of their daily necessities. The crop grown or product manufactured in a particular place may be influenced by the distinctive features and assets of the place. But most economic activities undertaken in one region are

influenced by interaction with decision makers located elsewhere. The choice of crop is influenced by demand and prices set in markets elsewhere. The factory is located to facilitate bringing in raw materials and shipping out products to the markets.

Globalization of the economy has been led primarily by transnational corporations, sometimes called multinational corporations. A transnational corporation conducts research, operates factories, and sells products in many countries, not just where its headquarters and principal shareholders are located.

Historically, people and companies had difficulty moving even small sums of money from one country to another. International transfer of money involved a cumbersome set of procedures, and funds could be frozen for several weeks until all of the paperwork cleared. Most governments prohibited the removal of large sums of money, and in the case of Communist countries, no money could be removed without government approval.

Modern technology provides the means to easily move money—as well as materials, products, technology, and other economic assets—around the world. Thanks to the electronic superhighway, companies can now organize economic activities at a global scale.

Banks, corporations, and other financial institutions are able to operate worldwide in part because the major centers where decisions that affect the global economy are made—New York, London, and Tokyo—are located in different time zones. When Tokyo's stock market closes at 3 P.M., it is 6 A.M. in London, only 2 hours before the opening of the day's trading there. The stock market opens in New York at 9:30 A.M., while London's is still open. When the market closes in New York at 4 P.M., it is 6 A.M.

the next morning in Tokyo, only 3 hours before the opening of the market there the next day. As a result, investors can react immediately to changes in the value of gold, the rate of exchange between the dollar and the yen, and other constantly changing elements of the global economy.

Every place in the world is part of the global economy, but globalization has led to more specialization at the local level. Each place plays a distinctive role, based on its local assets. A place may be near valuable minerals, or it may be inhabited by especially well-educated workers. Transnational corporations assess the particular economic assets of each place.

A locality may be especially suitable for a transnational corporation to conduct research, to develop new engineering systems, to extract raw materials, to produce parts, to store finished products, to sell them, or to manage operations. In a global economy, transnational corporations remain competitive by correctly identifying the optimal location for each of these activities. Especially suitable places may be clustered in one country or region or dispersed around the world.

As a result, globalization of the economy has heightened economic differences among places. Factories are closed in some locations and opened in others. Some places become centers for technical research, whereas others become centers for low-skilled tasks. Changes in production have led to a spatial division of labor, in which a region's workers specialize in particular tasks. Transnationals decide where to produce things in response to characteristics of the local labor force, such as level of skills, prevailing wage rates, and attitudes toward unions. Transnationals may close factories in locations with high wage rates and strong labor unions (Figure 1-17).

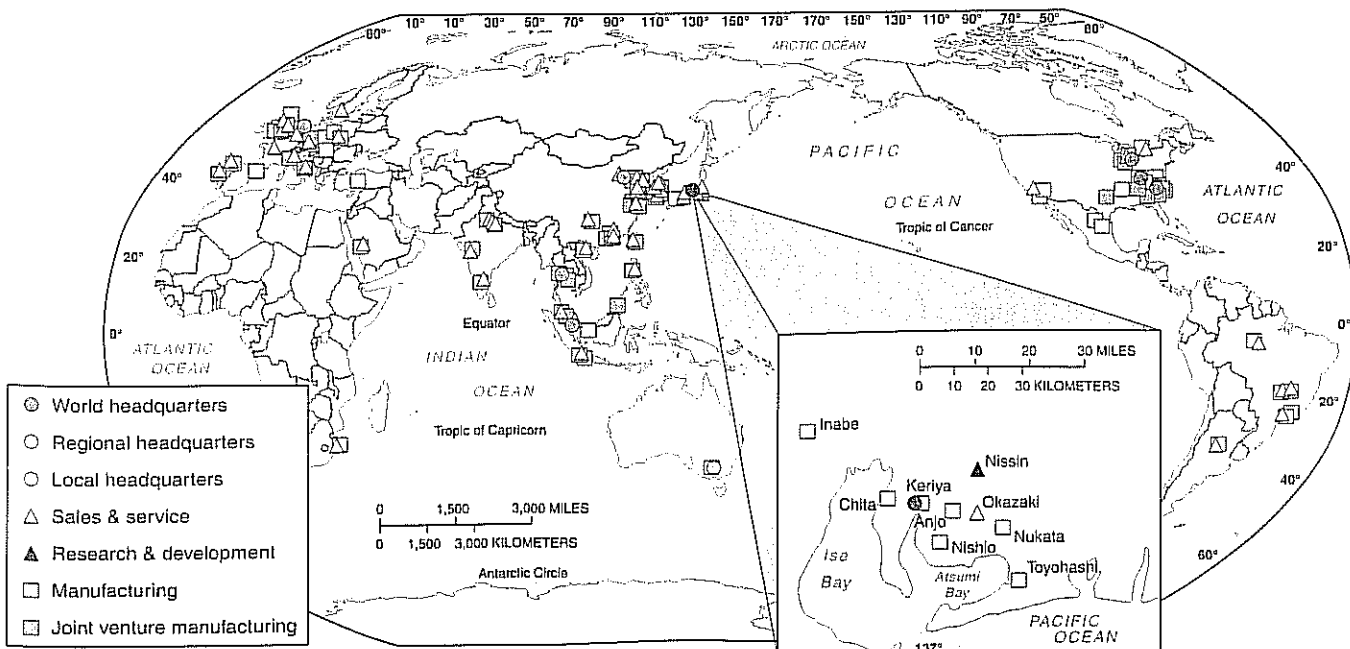


FIGURE 1-17 Globalization of economy. Denso, a transnational corporation that makes parts for cars, such as heaters and air conditioners, has its world headquarters, research labs, and eight factories in its "hometown" of Nagoya, Japan. Regional headquarters are located in the world's two other core regions—North America and Western Europe—the company's main overseas markets. A financial center is located in the Netherlands. Factories and sales centers are located in a number of more developed and less developed countries.